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1935... A STILL BIGGER YEAR FOR "ASTRINGENT" LEAD!

AMERICAN FRUIT GROWER

(Title Registered in U.S. Patent Office)

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Mary Lee Adams - John T. Bregger - Benjamin Wallace Douglas - Dean Halliday - T. J. Talbert

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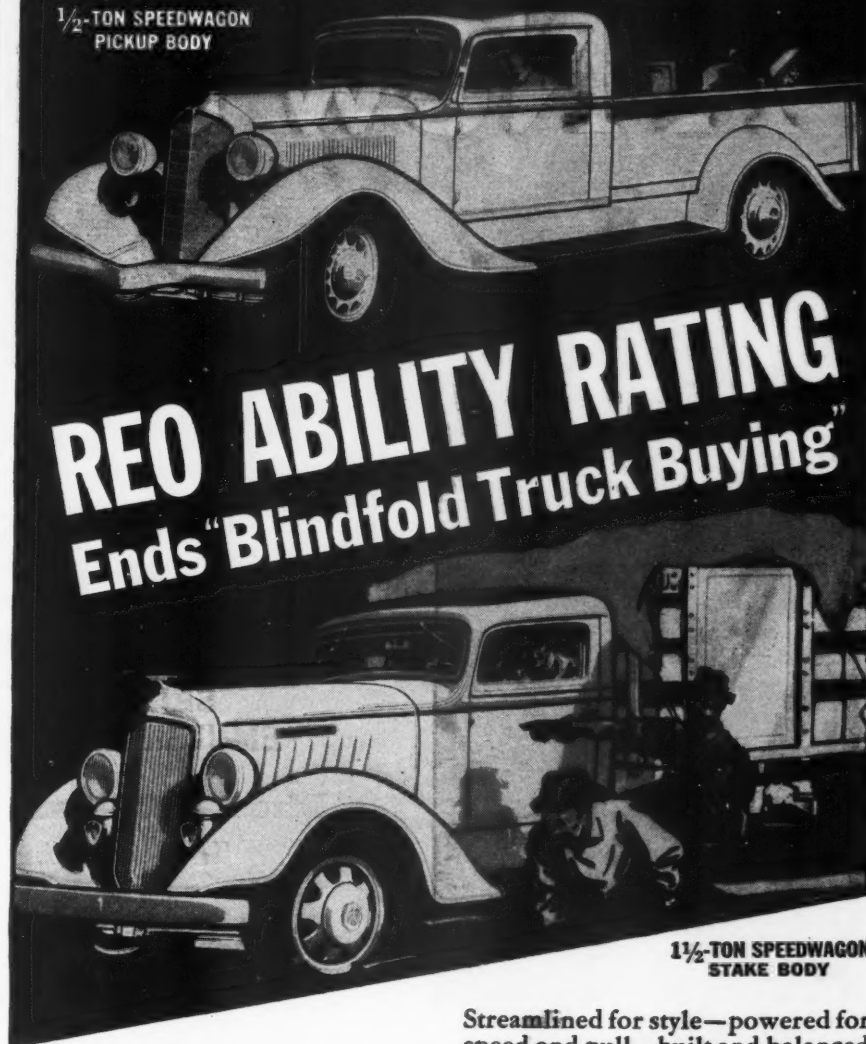
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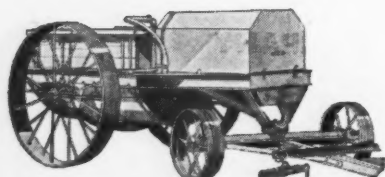
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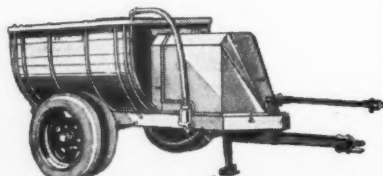
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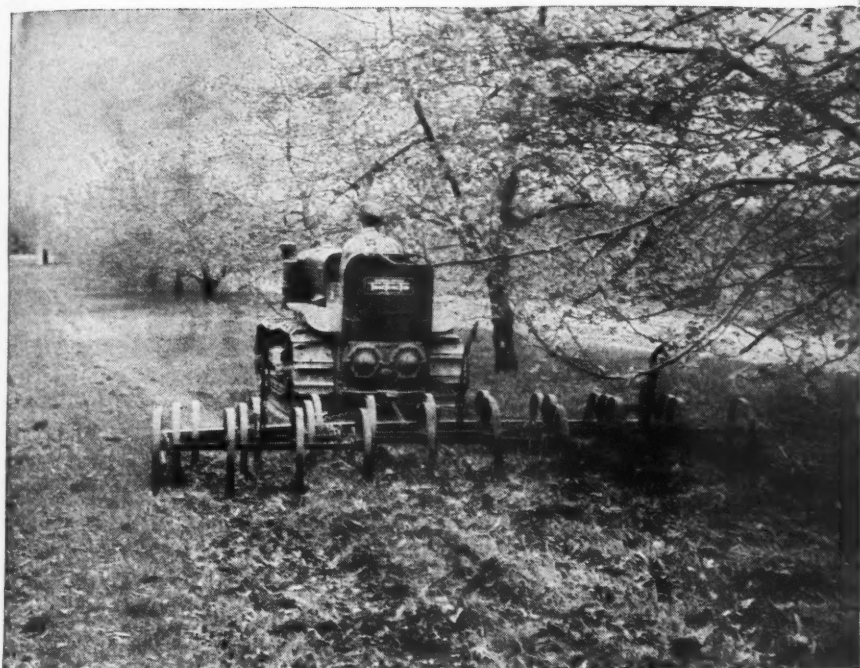
HARDIE DEPENDABLE SPRAYERS

SOME TRENDS IN ORCHARDING

By J. H. GOURLEY
Ohio Experiment Station



An irrigating flume in an Ohio orchard.



"Weed-hog" tearing up a bound sod condition to improve the tilth of the land.

THE New Deal has influenced fruit production and the problems of the orchardist less than most other lines of agriculture. The Agricultural Adjustment Act has not attempted to regulate acreage or production of fruit as it has with farm crops and live stock. The reasons for this are obvious, since fruit trees are perennial in nature and cannot be so readily removed or regulated as can annual crops. But there are many other reasons why no attempt has been made in this direction. This does not mean that there is no need for adjustment of production to demand, for that is only too obvious in most fruit regions. The slower method of allowing the natural consequences of overproduction to bring about a reduction in acreage has been followed.

While this procedure may be all that can be hoped for, there is a more intelligent effort being made in some

American Fruit Grower presents this article to its readers feeling that no one, perhaps, is better equipped, by experience and opportunities for keen observation, to write about trends in orcharding than the author, Dr. J. H. Gourley. His years as Chief in Horticulture for Ohio, and before that at the New Hampshire and West Virginia Experiment Stations, have given him breadth and depth of experience. In addition to his scientific experience in both field and laboratory in this country, Dr. Gourley spent a part of last summer studying apple growing in England. As an author, he is well known for his "Textbook of Pomology" as well as his book on "Orchard Management."

quarters to learn the better and poorer sites for orchards and to advise future orchardists of some of the pitfalls of the past. This trend of adaptation of plantings to suitable soils and favorable marketing situations is likely to grow in importance.

Many adverse experiences are

bringing about a tendency toward smaller orchard units than was in vogue some years ago. There are always exceptions to any rule, but the orchard unit of from 60 to 75 acres is likely to prove the most economical of management, and even a smaller one would often be wise.

The Fertilizer Trend

The most outstanding change in fertilizer practice of recent years is the tendency toward fall or early spring applications rather than the older one of spreading it about two to three weeks before blossom time.

The past few seasons have been impressive from the standpoint of little rainfall during the spring, with the consequence of late availability of the fertilizers to the tree roots. Such applications would have been more effective if there had been plenty of moisture in the soil. It happens that a very large part of the evidence on the use of nitrogen on fruit trees secured by the several experiment stations is the result of the use of nitrate of soda—a material which is somewhat hygroscopic, has very little capacity to be fixed by the soil, and therefore moves readily down into the root zone. It so happens that insofar as orchard practice is concerned, much less nitrate of soda is being used than formerly, sulphate of ammonia and calcium cyanamide having been substituted for the nitrate.

Neither sulphate of ammonia nor calcium cyanamide is particularly hygroscopic. Their action is somewhat slower than nitrate of soda and unless they are applied when the moisture conditions are suitable for their absorption by the soil and their transfer into the tree, the effects from their use are not nearly so good, at least for the current season.

It must also be kept in mind that,

(Continued on page 25)

CONTROLLING CODLING MOTH AT ITS WORST

By W. P. FLINT

Chief Entomologist, State Natural History Survey
and Illinois Agricultural Experiment Station.

THE question of controlling codling moth in badly infested mid-west orchards has been a most perplexing one during the past four years. In many orchards the infestation during this period has continued to build up in spite of control measures. The results of the experimental work and growers' efforts in 1933-1934 have demonstrated that it is possible to clean up the codling moth in nearly all of the badly infested orchards if the necessary measures can be profitably taken. There are some Illinois orchards where the trees are badly scarred and where the potential production would not warrant going to the expense necessary for a thorough codling moth clean-up, and in such orchards it is only a matter of sound economy to cut off the orchard rather than clean it up.

I would say at the start of laying out a clean-up program that, at least under Illinois conditions, we have no reason to believe that codling moth can be controlled without a thorough clean-up of the orchard and an extremely heavy spray program which will necessitate washing the fruit before it is marketed.

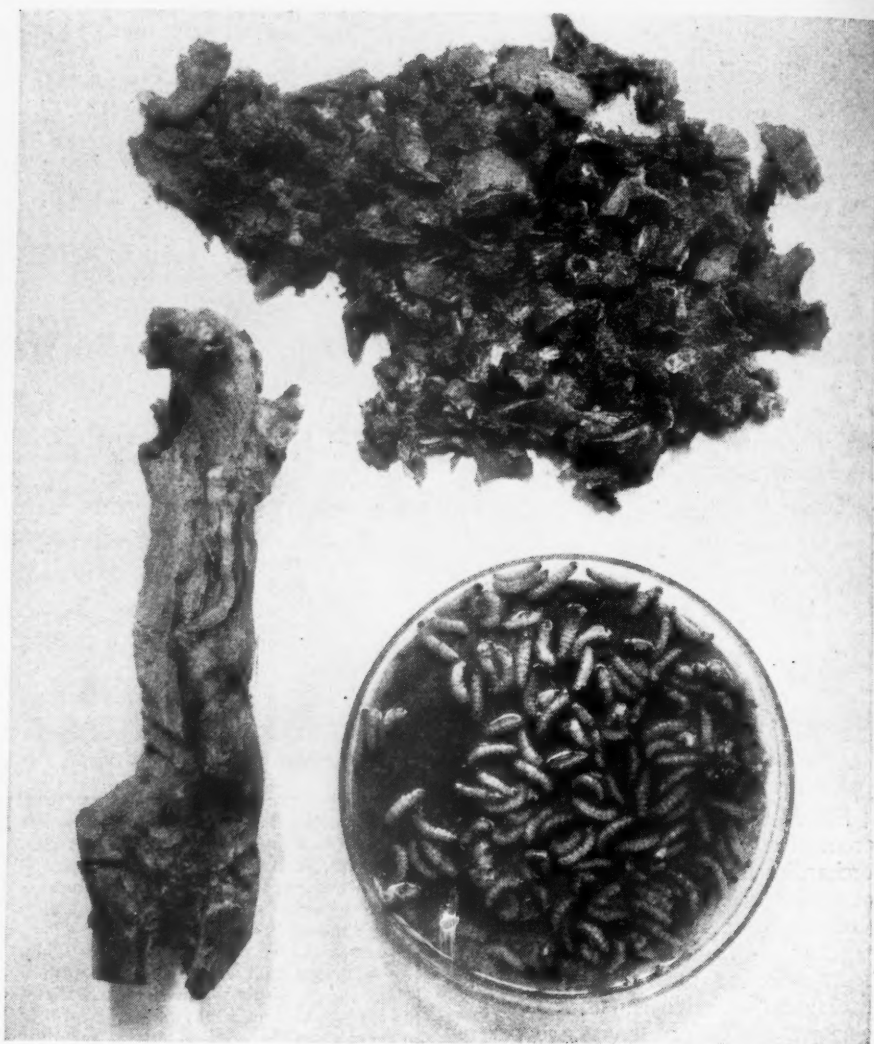
Taking the steps of clean-up in the order in which they will occur from this date on, we would first go over the orchard and prune carefully, opening up the trees in a manner to permit thorough spraying. Where the tops of the trees are so high that they cannot be effectively sprayed, they should be pruned out, as poor spraying of the tops is frequently one of the reasons for the continuation of heavy codling moth infestation. After pruning, the orchard should be thoroughly cleaned of prunings, and other trash refuse should also be removed and cleanly burned. This work should be accomplished before April 1.

Previous to clean-up, the trees should be thoroughly scraped, taking off all of the rough bark but not going into the live wood. Old pruning wounds should be carefully gone over

ing these wounds. This should be applied with a brush and enough put on to really penetrate the wood. Care must be taken not to get any of the mixture on the live bark.

Satisfactory control cannot be obtained in a bearing orchard unless attention is given to the pruning and thorough clean-up of the orchard and vicinity.

The next step in the program should be to give attention to the packing shed and where possible, if the shed is in or close to the orchard, provision should be made for screening it by covering all possible exits of codling moth adults from the shed



One hundred and thirty-six hibernating worms were removed from this six-inch piece of wood picked up in a heavily infested orchard. Such a severe infestation must first be reduced by other measures before spraying can be effective.

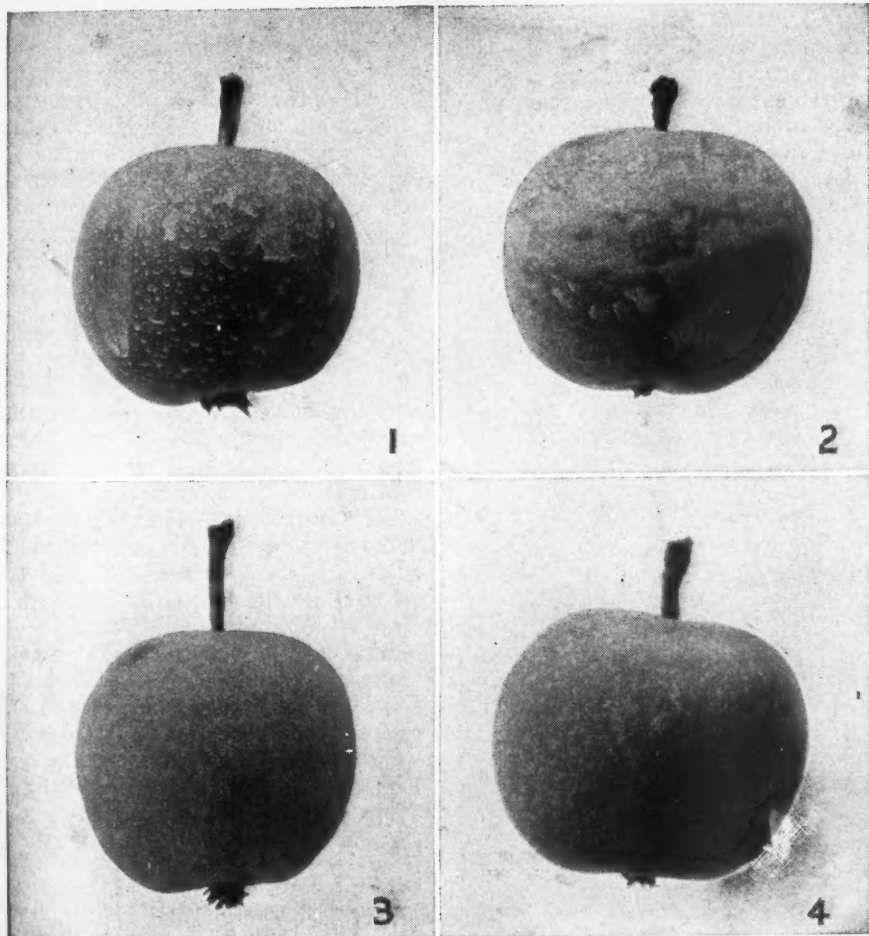
and smoothed up as much as possible. In pruning, particular attention should be paid to decaying stub ends of limbs or small hollows left by the rotting out of old pruning wounds. These should be cleaned off and painted with any good tree paint. If care is taken not to get the material on the live wood, a mixture of 10 percent creosote in 90 percent thin coal tar is very effective in treat-

to the orchard. One large grower in southern Indiana, Merle Troth, has screened a large packing shed at a cost of approximately \$35 per year and has caught as high as 200,000 codling moths within the shed in one season. Estimating that half of these moths were females and that each laid only 100 eggs, which is a small number, you would certainly have

(Continued on page 18)



Spraying with oil in an Indiana orchard. Oil makes a "beautiful" spray and its application is easy for the operator.



THE fruit grower of today may look upon the oil spray as a new development—and in many ways it is—but the earliest use of an oil for the purpose of insect control goes back more than 150 years. One of the first positive records in the use of oil as an insect killer brings in the name of Mr. J. M. E. Goeze, who recommended petroleum, turpentine, and other types in 1763, but warned against their injury to the plant itself. William Forsyth specifically mentioned the use of whale oil against scale insects in 1800. Other dates and events of interest in the coming use of oil in America include a recommendation in 1865 for using kerosene undiluted (applied with a feather on citrus trees for the control of scale), a kerosene and soap spray mixture by Henry Byrd of New Jersey in 1865 for the control of currant worm, and the original

(Continued on page 22)

Group illustration of Jonathan apples from Ringhausen orchard showing type of spray coverage and deposit secured with:

- (1) Arsenate of lead and lime
- (2) New summer oil, lead and lime
- (3) Miscible oil, lead and lime
- (4) New summer oil and nicotine



The Klondike strawberry grown in Louisiana where the plants are set in October and November and the crop harvested the following April and May. This furnishes an opportunity to grow a cover crop in the summer and plant back to strawberries in the fall. This is an annual rotation, as is the case in Florida also.

FACTORS AFFECTING ROTATION CROPS FOR STRAWBERRIES

By GEORGE M. DARROW
U. S. DEPARTMENT OF AGRICULTURE

PART 2

STRAWBERRY growers more and more appreciate the fact that large yields depend on fertile soil. The naturally fertile soils are desirable, but many soils not naturally very fertile can be used for strawberries and can be made productive by growing and turning under some green manure crop just before planting to strawberries. Such a crop should not be too woody and fibrous but should decompose readily and should leave the soil in a good state

of tilth. The deep rooting of a crop like sweet clover and alfalfa is perhaps not as important as in orchards but may be desirable on many soils.

The growth of leguminous crops preceding strawberries for both their green manure and nitrogen-furnishing value is now a common and recognized practice. In Florida, crotalaria, velvet beans, Brabham, Victor or Iron cowpeas, and other legumes are plowed under just before planting strawberries. In the entire South,

cowpeas and soybeans are widely used for plowing under before planting strawberries. If planting is delayed until late spring, vetch or Austrian peas may be used. In more northern sections, strawberries often follow a crop of rye and vetch turned under in early spring. However, it has been found that a certain carbon-nitrogen ratio is essential if the rye or other crop is to decompose and furnish the maximum amount of humus, and allow the bacteria that decompose the rye to get enough nitrogen for their use without starving the strawberry plants. Rye and other non-legume crops may furnish too little nitrogen in proportion to the carbon for both the bacteria and the succeeding crop. Therefore if a heavy growth of rye only is turned under, it may be essential to broadcast nitrate of soda or sulphate of ammonia when plowing to insure readily available nitrogen for the plants. However, if there is a heavy growth of vetch with the rye and the rye is turned under while still succulent, little or no additional nitrogen may be needed to maintain the carbon-nitrogen ratio.

In dry sections, alfalfa has been found to use available moisture supplies to a depth of many feet so that succeeding crops may have limited supplies. In regions with good moisture conditions or where irrigation is practical, alfalfa (and sweet clover) are desirable crops to precede strawberries because of their beneficial effect on soil tilth as well as on fertility and humus content.

Soil Acidity

Soil reaction, whether acid, neutral, or alkaline, may affect the crop rotation because different crops succeed best on soils of different reaction. If other conditions permit, those crops succeeding best in soils of the same acidity as the strawberry should be selected for the rotation. Morris and Crist of Michigan, and Waltman of Kentucky, have shown that in general the strawberry grows best where the soil is somewhat acid (pH 5.5 to 6.5), though there are some nearly neutral soils in the West where it thrives. Lineberry has recently shown that the

(Continued on page 27)

Looking across a row of Marshall strawberries under the hill system. Nelson Brothers Strawberry Farm, Santa Rosa, Calif.



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Applying a tar oil-petroleum oil combination to apple trees. Thorough spraying is necessary for control of both scale and aphid.

TAR OIL DISTILLATES

THEIR SOURCE, PROPERTIES AND VALUE IN THE SPRAYING OF FRUIT TREES

By R. H. HURT

VIRGINIA AGRICULTURAL
EXPERIMENT STATION

THE introduction of certain tar oil distillates as spray oils into our dormant spray schedule is, indeed, the most important addition to our knowledge of the control of fruit pests that have been made in recent years. The use of tar oil distillates, either alone or in combination with petroleum oils, has rapidly spread in the United States, with the result that these oils are now used to some extent in all of our fruit growing areas. The tar oil-petroleum oil combinations are rapidly replacing the dormant strength lime-sulphur solution and the straight petroleum oil emulsions in Virginia. This is especially true in our Piedmont fruit growing section.

The history of the tar oil sprays has been pretty thoroughly discussed in the literature dealing with this subject and it will not be necessary to go into a detailed discussion of their origin as fruit tree sprays. It might be proper, however, to state that it seems from the best available information that the first tar oil spray was manufactured in Holland and was used in that country as early as

1917, and that this preparation was introduced into England in 1920. According to this information, tar oil sprays have been in use about 17 years in Holland, 14 years in England, and seven years in the United States. The literature, of course, makes mention that tar oil distillates were used as tree paints very much earlier than 1917, but it is doubtful if these earlier preparations were prepared as true fruit tree sprays and applied to the entire tree.

In the process of making coke from coal, large quantities of crude tar are obtained as a by-product. The characteristics of the various kinds of tar are determined by the nature and proportion of their constituents, and these constituents vary somewhat according to the type of coal carbonized and according to the conditions under which they are distilled. There have been several hundred substances identified in coal tar but only a very limited number of these substances are of interest to the fruit growing industry. There are three main classes into which coal tar products fall; namely, neutral, acid, and basic. All three of these classes of material are found in some degree in the tar oil distillate fractions which are suited and used for spraying purposes.

The tar oil distillate fractions

which are of interest to the fruit industry and manufacturers of spray materials are the creosote and anthracene oil fractions. The creosote and anthracene oil fractions are the portions of the tar oil distillate which are distilled off approximately between 225° C. and 400° C. The minimum boiling point of a spray oil, however, may be very much higher than 225° C. but the maximum boiling point should not be over 400° C. for best general results as a fruit tree spray oil.

It has come to the writer's attention in recent months that water gas oils have been suggested as a substitute for the coal tar oil distillates which are now used as aphicides. The writer wishes to make clear that these water gas oils are very different in many respects from the coal tar oils and will not give the efficient results that the coal tar oil distillates will give in the control of aphids in the dormant stage. The fractions of water gas oil which the writer has had an opportunity to test have been very ineffective as ovicides for the control of aphids.

It was pointed out earlier in this article that coal tar oil distillates are composed of three main classes of materials; namely, neutral, acid, and basic portions. The portion of tar oil distillate which is best suited for the spraying of fruit trees is the high boiling neutral fraction. Since it is

(Continued on page 21)

AMERICAN POMOLOGY

*A Page Conducted in the Interests of the
American Pomological Society*

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Spray Tolerances

STATE horticultural societies have been advised of the action taken in regard to the spray residue problem at the last convention of the A.P.S., held in joint session with the Michigan State Horticultural Society. It was felt then that a set of resolutions in regard to the lead residue situation should be followed up by personal conferences with the proper authorities in Washington. (See January A.F.G.) Such a conference was arranged for January 4 and 5. By prearrangement, President B. S. Pickett met R. G. Phillips, secretary of the International Apple Shippers' Association, and W. S. Campfield, secretary of the Virginia State Horticultural Society, in Washington. These three men acted as a committee to visit officials in the Department of Agriculture and the Pure Foods Administration. Conferences extended over a two-day period, and President Pickett reports that very successful interviews were had and that the case of the fruit-growing industry was clearly presented to those officials who are charged with the responsibility of setting the lead tolerance for 1935.

The secretary's office of the A.P.S. wrote the various state horticultural societies relative to this particular activity, and suggested the desirability of affiliation in order to present a stronger front in such cases as the lead residue problem. Funds from such sources are needed to support the work of the A.P.S. in making possible such conferences as the one just held in Washington.

Apple Export Market

While in Washington on January 5, your President took advantage of the occasion to advise with Dr. L. A. Wheeler, acting in charge of Foreign Service Bureau of Agriculture, U.S.D.A., on the apple export situation. The German market was reported 90 per cent below last year at the same time, and the English market between 30 and 40 per cent below 1934, for the same time, a condition which suggests that organizations representing the apple growers and the growers themselves should request all concerned with international trade agreements to work for their interests in promoting apple exports. Letters to Dr. L. A. Wheeler, Secretary of Agriculture Henry A. Wallace, and to congressmen and senators will help.

Please do not take this suggestion lightly. If you will follow it, your personal or organization letters will go to the right place to lend real backing and encouragement to the departments in Washington who are trying to make it possible for us to hold or win back our old place in the export markets. Where will we be in October of this year if we have a bumper



PROF. B. S. PICKETT

Re-elected President of American Pomological Society

crop of apples, unless we have an export outlet?

Personals

While visiting Dr. E. C. Auchter, chief of the office of Horticultural Investigations, your President had the pleasure of running into Harry Simpson of Vincennes, Ind., and one of the Allens of Salisbury, Md. Both had been attending the meetings of the Maryland Horticultural Society at College Park. Mr. Simpson expressed his gratification at the mission of the committee and added his word to the committee's representations to Dr. Auchter. Both recalled your President's visits to their homes during the summer of 1934.

U. S. RESIDUE TOLERANCES SET FOR 1935

Special
Washington, D. C., Jan. 25—It was announced today by Secretary of Agriculture Henry A. Wallace that the quantity of lead residue permitted on interstate shipments of apples and pears during the 1935 season would be reduced from .019 to .018 grains per pound of fruit. The tolerance for arsenic and fluorine will remain the same as last year, at .01 grain per pound.

Pomological Tour?

Several years ago the American Pomological Society sponsored a comprehensive tour of the principal fruit regions of the Pacific Northwest. One of the middle-western colleges has conducted three protracted travel courses, two in the eastern states and one on the Pacific Coast. Another middlewestern school has conducted a western travel course. A college in a leading eastern pomological state has expressed an interest in such a tour this year.

All except the A.P.S. tour were organized for students, but perhaps fruit growers or their sons would like to participate in such an undertaking this summer. A student tour, requiring a minimum time of five weeks, conducted through the Pacific Coast states by bus, would cost \$200 per person. This would pay for transportation, food, lodging, registration fees, if conducted by a college or organization, and conduction if managed by the A.P.S., and leave a little for laundry and personal expenses. (An eastern trip conducted in 1934 cost an average of \$165 per student.)

An A.P.S. tour would cost more or less than a student tour depending on the amount of comfort demanded by the travelers in meals and overnight lodgings, but such a tour could be organized comfortably at a cost somewhere between \$200 and \$225 per person for necessary expenses. Conducted as a unit, it would be possible to arrange pomological contacts in advance and secure personal attention at all points of interest.

The president and the secretary invite your comments and will present a tentative outline for such a trip in the April number if your inquiries warrant it.

Annual Report

The annual report for 1934 depends for its time of appearance on the printing arrangements which the Michigan State Horticultural Society is able to make with the State printers in Michigan. It will be mailed to members as soon as possible after it comes from the press. Secretary H. D. Hootman of the Michigan Society is pushing his part as rapidly as conditions permit.

State horticultural societies are invited to join the American Pomological Society as affiliate members and support the service work in every way possible. Organization membership is \$25 per year.

Annual membership, \$1.00; with subscription to AMERICAN FRUIT GROWER, \$1.25.

Please remit fees to the secretary at Ames, Iowa.

H. L. Lantz

APHIS BUD-MOTH SCALE SCAB



IN JUST ONE SPRAYING YOU GET ALL FOUR

When you use **"BLACK LEAF 40"**
with Lime Sulphur & Lead Arsenate



50 POUND DRUM MAKES

4,000 gallons of spray
(1 pint to 100 gallons
of water)

5,000 gallons of spray
($\frac{3}{4}$ pint to 100 gallons
of water)

6,000 gallons of spray
($\frac{2}{3}$ pint to 100 gallons
of water)

8,000 gallons of spray
($\frac{1}{2}$ pint to 100 gallons
of water)

SEE YOUR SPRAY
MATERIAL DEALER

"Black Leaf 40"

APHIS, Bud-Moth, San Jose Scale, Scab and other pests, if present, can be controlled with *one delayed dormant combination spray* of "Black Leaf 40," Lead Arsenate and Lime Sulphur. Because it is usable with these standard materials, there is no necessity for applying "Black Leaf 40" separately. Thus, by this one delayed dormant combination spray, you effect important savings of time and labor—*without any risk of tree injury*. Ample assurance of this is found in more than two decades of use.

"BLACK LEAF 40" IS SAFE TO USE. "Black Leaf 40" is a poison of vegetable origin. It is not caustic—does not "burn" man, horses, trees or crop. "Black Leaf 40" is volatile and "fumes-off" (evaporates), leaving no residue problems for you to solve. "Black Leaf 40" is concentrated—effective—easy to mix and to apply. It kills many different kinds of insects and fortifies other insecticides with which it is used.

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(3556)



DUSTING IN THE RAIN

Sounds ridiculous to anyone who has never done it—and saved his Apple Crop from Scab and his Peach or Cherry Crop from Brown Rot.

It can't be done with Ordinary Sulphur Dust—BUT IT CAN BE DONE WITH KOLODUST (The Fused Bentonite-Sulphur Dust).

When the rain drives the Spray Rig to the barn, hitch right up to THE DUSTER and finish up—and enjoy that feeling of security that hundreds of Fruit Growers have through the disease threatening season.

Finish up the Season Spray Program with the Duster and relieve yourself of many worries about "Spray Residue."

SPRAY WITH KOLOFOG

THERE ARE 25 REASONS why you should, all described in a pamphlet which will be sent you upon request. We will be pleased to write you in detail—about this great Summer Colloidal Sulphur Spray that SAVES THE LEAVES and yet will thoroughly protect your Fruit Crop.

**NIAGARA SPRAYER and
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Box 45 Middleport, New York

STATE HORTICULTURAL NEWS

Variety of Topics Discussed at Maryland Meetings

THE 37th annual meetings of the Maryland State Horticultural Society were held in the Horticultural Building, University of Maryland, College Park, January 2 to 4.

The commercial and machinery exhibits were larger and more attractive than ever before. The educational exhibits, illustrating the life history of fruit diseases and insects, as well as exhibits of fruit showing studies of thinning, fruit maturity and time of picking, together with fruit displays, including marketing exhibits, fruit varieties and packing methods, were large and varied. Prominent growers were present from Maryland and the five neighboring states. Various speakers discussed such topics as comparison of nitrogen fertilizers and time of application, the russetting of fruit, control of rosy apple aphid, orchard irrigation, core injury and internal breakdown of apples, increasing of organic matter in orchard soils, fruit harvesting and packing methods, and a general survey of fruit washing investigations and experiences under Maryland conditions.

Good Results from Split Fertilizer Applications

Among the interesting points brought out by the various speakers was the fact that split applications of various types of nitrogen fertilizers, applied in the fall and in the spring, gave better results than applications made in either the fall or the spring.

The russetting of fruit was declared to be much under the control of the grower if proper care was exercised in better selection of orchard sites and in spraying when temperature is not too hot or too cool. Spray materials and methods of application were also reported as being responsible for some injury.

Orchard irrigation under eastern conditions was considered practical only if water supply was near-by and pumping costs would not exceed about \$25 per acre.

Methods of getting organic matter into the orchard soil showed considerable favor in use of mulch in older orchards and the intensive attempts to cover crop the young orchard heavily.

Some increase was noted in red mite in some sections of the State. The State entomologist suggested delayed dormant oil spray as better control of mite eggs than dormant sprays.

Codling moth control was fully discussed, and the grower's only hope seems to lie in thorough spraying, using arsenate of lead, and being prepared to wash his fruit if a heavy spray schedule is necessary. Such sanitation measures as quick disposal of drops and culls, removal of brush and trash from the orchard, destruction of woody weeds, removal of props after harvest season, scraping and banding of trees, destruction of tree scrapings, screening of packing houses, and storage of crates and picking equipment in moth-tight buildings were given as other helps in codling moth control.

The fruit washing discussions showed that under various heavy types of spray

schedules used experimentally, it was possible to reduce most of the residues below tolerance (under eastern conditions) by the use of one-half per cent to one and one-half per cent acid, heavier residues requiring the addition of heat or a wetting agent. Generally, with the use of acid, heat, and a wetting agent it was found possible to reduce all residues below tolerance in a flotation washer with little difficulty.

The procedure necessary for residue removal will depend upon the amount of residue present and the types of spray materials used. Washing solution strength and temperatures should be carefully controlled and fruit should not be exposed to the solution for too long a period. Fruit should be rinsed thoroughly.

The Maryland growers are looking forward to the coming season with optimism and the orchards are being well cared for.

A. F. VIERHELLER, Sec'y,
College Park.

Turkeys Assist Ky. Growers

THERE was a splendid attendance at the 79th annual meeting of the Kentucky State Horticultural Society at Lexington. Unusual interest was displayed in problems of growing and marketing fruits.

Our organization featured at this year's meeting irrigation for apple orchards and the handling of turkeys to build up and maintain orchard fertility. One of our growers was able to report the successful production of more than 5000 turkeys in his orchard, with a consequent gradual added fertility to the soil as well as very definite evidence that turkeys are very beneficial in the control of insects and diseases. This is quite a new venture with us and naturally the work reported was interesting to all present.

Many of our growers are giving considerable thought to the matter of irrigation. Where water is available some such work has already been done and results are more than satisfactory.

BEN E. NILES, Sec'y.,
Henderson.

Oregon Meeting Most Successful

CONSIDERATION of such problems as marketing fruit under the present economic handicap, control of the ever increasing destructive hordes of codling moth, thinning and pruning bearing Newtown apples, profitable production of Anjou pears, zinc sulphate treatment of cherry trees for control of "little leaf," financing fruit production, management of orchard soils to assist in maintaining fertility and production by the use of cover crops, and results of seven years of experimental work with fertilizers on orchards at Wenatchee were the high points of the discussions at the annual meeting of the Oregon State Horticultural Society on December 10 and 11 at Hood River.

The annual banquet of the society was held at Rockford Grange Hall, near Hood

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River. The serving of this banquet by a farm organization is rather an innovation for the society and the members liked the idea.

Dean W. A. Schoenfeld, Oregon State College, speaker at the banquet, pointed out that those in charge of national affairs affecting agriculture probably have a clearer conception of what ails agriculture than any previous administration. He emphasized the need of cheaper transportation for fruit from the Oregon country to out-of-State markets, and the possibility of increased water transportation for this product.

Among the resolutions passed was one urging greater support of the frozen-pack laboratory at Seattle, and another urging fast and sure federal action concerning violations of the regulations of the Northwest fruit marketing agreement.

Prof. H. P. Barss, formerly in charge of Plant Pathology, Oregon State College, but now associated with the U.S.D.A., was elected to honorary membership in the society in recognition of his long service in behalf of the fruit industry in the State of Oregon.

The 1936 meeting of the society, which by the way is the 50th anniversary meeting, will be held at Corvallis. Elmo Chase, Eugene, is president; Elmer Chastain, Milton, first vice-president; Gordon Voorhies, Medford, second vice-president; Dan Pierson, Hood River, third vice-president; and O. T. McWhorter, Corvallis, secretary-treasurer. Raymond W. Reter, Medford, was re-elected for a term of three years to serve as trustee. The hold-over trustees are Glen B. Marsh, Hood River, and Howard Merriam, Goshen.

The report of the society also contains the proceedings of the annual meeting of the Western Nut Growers' Association, held in Portland.

O. T. McWHORTER, Sec'y.
Corvallis.

Okla. A. & M. Students Visit Rio Grande Valley

GEORGE WOOD and Nicholas Tolmatchoff, Stillwater, and Enoch Kenworthy, Pershing, senior students of the department of horticulture, Oklahoma A. & M. College, Stillwater, accompanied by two staff members, E. F. Burk and Franklin J. Ruedel, visited the Rio Grande Valley citrus and vegetable section during the recent school holidays.

The group drove 2,500 miles through the extensive Winter Haven vegetable section and the vegetable and citrus groves of the lower valley, through Mission, McAllen, Weslaco, and Harlingen. The vegetable and citrus packing sheds as well as the methods of car loading were very interesting to the group. A grapefruit juice canning plant was also visited. Occasional stops were made to visit greenhouses and lath houses.

The Oklahomans went into Mexico at both Laredo and Brownsville. The group was accorded a cordial reception wherever they stopped, and much valuable information was obtained by the students of the methods of culture for the various crops grown.

If present plans materialize, this may become an annual trip for Stillwater students.

The West Virginia State Horticultural Society annual meeting will be held at Martinsburg on February 13 and 14.—Carroll R. Miller, Sec'y, Martinsburg.



Have You Had a Demonstration of the McCormick-Deering O-12 Tractor In Your Orchard?

MANY ORCHARDISTS have seen the McCormick-Deering O-12 at work in their own orchards and groves . . . have climbed into the seat and piloted this compact, economical, pneumatic-tired tractor between the rows and over ditches for a real try-out. As a result, the power work in many orchards is now being done with this new, small tractor—at lower costs. The O-12 is built to pull one 16-in. or two 10-in. plow bottoms, but many users report a much broader range of usefulness. And an important consideration is the O-12's ability to work hard all day on a gallon of fuel per hour or less.

Sound, solidly established McCormick-Deering dealers in orchard sections stand ready to demonstrate the Model O-12 on request. Step to the phone and ask the McCormick-Deering dealer in your town to bring out an O-12 for a real demonstration. If your orchard or grove is old and closely grown, or if you require a specially compact tractor for any other reason, you will get a big thrill out of the compactness and convenience of the new McCormick-Deering O-12.

The McCormick-Deering line also includes TracTracTors in two sizes and wheel tractors in sizes up to 4-plow. Specific information will be sent on request.

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McCORMICK-DEERING

WAXY, SMOOTH FINISH—HIGH COLOR—

More

THE NEW SHERWIN-WILLIAMS

It's the high sulfur deposit secured by the combined use of Sherwin-Williams Dry Lime Sulfur and Mulsoid Sulfur that will enable you to grow apples free from scab and russet and to maintain healthy, vigorous foliage on your trees next season.

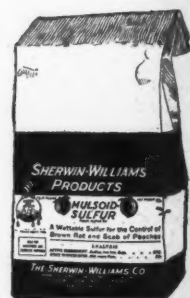
Experiments conducted by our own research department and the experience of many successful orchardists are combined in our recommended spraying schedule, which will produce a heavier deposit of non-injurious sulfur residue which will control scab on your apples and foliage—and this does NOT mean the use of caustic liquid lime sulfur. Liquid Lime Sulfur at any practical dilution will russet your apples and "brown" the foliage, when used either alone or combined with a wettable sulfur.

For the cluster-bud or pink spray, use 3 pounds of Sherwin-Williams Dry Lime Sulfur to 50 gallons of water in the calyx spray. Those applied one week, ten days and two weeks after the calyx spray should use 1 pound of Sherwin-Williams Dry Lime Sulfur plus 2 pounds of Mulsoid Sulfur and 2 pounds of Hydrated Lime to 50 gallons of water. In the application 4 weeks after the calyx spray use 2 pounds



of Mulsoid Sulfur with 2 pounds of Hydrated Lime to 50 gallons of water. In this combination of Dry Lime Sulfur and Mulsoid Sulfur, you will get a high deposit of non-caustic, adhesive, scab-controlling sulfur residue. Sherwin-Williams Dry Lime Sulfur is stabilized, 33° Baume liquid lime sulfur of the purest composition. It is the Original Dry Lime Sulfur, made according to a patented process. Mulsoid-Sulfur is a wettable sulfur con-

taining not less than 98% of sulfur having a minimum of 300 mesh plus an adhesive wetting agent. Make your apple spraying program for 1935 a safe and sure one—keep away from injurious liquid lime sulfur that causes russetting of apples and foliage injury. Follow the schedule we have recommended and spray thoroughly with the dependable Sherwin-Williams Dry Lime Sulfur-Mulsoid Sulfur combination. For complete information and help, address THE SHERWIN-WILLIAMS CO., *Insecticide Department*, 101 Prospect Avenue, Cleveland, Ohio.



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SPRAY AND DUST

UNINJURED FOLIAGE

A-Grade Apples WHEN YOU FOLLOW APPLE SPRAYING SCHEDULE

THE SHERWIN-WILLIAMS
New
1935 APPLE SPRAYING SCHEDULE

SAN JOSÉ SCALE		
SCAB	DELAYED DORMANT	12 to 15 lbs. Dry Lime Sulfur
SCAB	CLUSTER-BUD OR PINK	3 lbs. Dry Lime Sulfur
SCAB	CALYX	1 lb. Dry Lime Sulfur, 2 lbs. Mulsoid Sulfur and 2 lbs. Hydrated Lime
SCAB	ONE WEEK AFTER CALYX	1 lb. Dry Lime Sulfur, 2 lbs. Mulsoid Sulfur and 2 lbs. Hydrated Lime
SCAB	TEN DAYS AFTER CALYX	1 lb. Dry Lime Sulfur, 2 lbs. Mulsoid Sulfur and 2 lbs. Hydrated Lime
SCAB	TWO WEEKS AFTER CALYX	1 lb. Dry Lime Sulfur, 2 lbs. Mulsoid Sulfur and 2 lbs. Hydrated Lime
SCAB	FOUR WEEKS AFTER CALYX	2 lbs. Mulsoid Sulfur and 2 lbs. Hydrated Lime

THESE DILUTIONS ARE PER FIFTY GALLONS OF WATER
For the control of codling moth, add 1½ pounds of Sherwin-Williams arsenate of lead to each 50 gallons of spray



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M A T E R I A L S

Now... LOWER COST GROVE CARE



Lighter by about 1000 pounds than similarly powered orchard tractors, this modern, compactly engineered Case tractor offers growers an entirely new kind of low-cost, big capacity power for disking, plowing, spraying and other grove work.

Its powerful engine burns distillate, kerosene and other low-cost fuels. Dust damage is prevented by oil filter air cleaner and tightly sealed engine. Full pressure lubrication. Built to stay clear of repair expense for a long time. Low and narrow. Goes in close to trees and pulls full loads on short turns. See it at your Case dealer—or mail coupon.

MODERN TILLAGE TOOLS

Grove plows, disk harrows, offset disks, subsoil tillers especially designed for the various soils and conditions of Florida, Texas, California, Michigan, Virginia, New York and other fruit sections.

CASE

77 Modern Farm Machines

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or Booklet free with purchase of a "Snap-Cut" Pruner at your hardware or seed store...

CONTROLLING CODLING MOTH

(Continued from page 8)

from this shed alone a sufficient source of infestation to make it almost impossible to secure satisfactory codling moth control in the adjoining orchard.

Arrangements should be made for banding all of the older trees in the orchard, that is, those that are six inches or more in diameter, using a chemically treated, cold-dipped band and applying these bands early enough to get the first larvae coming down the trunk in June.

Next and most important is to follow a thorough and effective spray schedule. A schedule recently worked out by the Purdue and Illinois entomologists and horticulturists will, it is felt, give satisfactory control in most heavily infested orchards. This spray schedule is as follows:

(1) The usual dormant spray should be applied if scale is present in the orchard. (2) The pre-pink and (3) pink spray using the fungicide recommended by the state agricultural experiment station in which the orchard is located. In the more northern parts of the midwest the pink spray will probably need an insecticide. (4) In the Indiana-Illinois section no insecticide is necessary until the calyx spray. This spray should consist of the recommended fungicide, in most cases lime-sulphur, three pounds lead arsenate, and two to three pounds of hydrated lime. In applying all sprays extreme thoroughness is necessary. Trees must be sprayed from the outside in, and the inside out, from the top down and from the bottom up.

(5) Following the calyx spray, in heavily infested orchards or in orchards where curculio is a problem, a seven-day spray should be applied, this to consist of four pounds lead arsenate and five quarts liquid lime-sulphur or five pounds dry lime-sulphur. This is the most important spray for the control of curculio.

(6) The second cover spray should come 15 to 20 days after the calyx spray, the interval depending on the weather and codling moth development, which information can be obtained from your local experiment station. The spray should consist of four pounds lead arsenate and four pounds hydrated lime and if necessary a fungicide applied according to the disease development of the season. If lime-sulphur is used in the spray, oil cannot be used with it. If lime-sulphur is not used, two quarts

of actual summer oil in the form of an oil emulsion should be added. (These summer oil emulsions usually contain from 66 to 85 percent actual oil and the number of quarts of emulsion to use will depend on the oil content. For an 83 percent oil emulsion, use three quarts of the emulsion to give the desired amount of oil.) If lime-sulphur has been used in the seven-day spray, a weak Bordeaux should be included in this spray, consisting of one-half pound copper sulphate and three pounds lime in each 100 gallons of water.

(7) The third cover spray should be given 10 days later or, if the weather is especially warm, one week later. It should consist of four pounds lead arsenate, four pounds hydrated lime and two quarts actual oil, the oil to be reckoned as in the second cover spray.

(8) A fourth cover spray should come 10 days later, consisting of three pounds lead arsenate, three pounds hydrated lime and two quarts summer oil. If the orchard is carrying an especially heavy infestation, it is best to shorten the interval between the second, third and fourth cover sprays to seven days and add a fifth cover spray, using the same materials as recommended for the fourth. This would give a calyx and five cover sprays for first brood control. We realize that this is a very heavy spray schedule but under the conditions that have existed in the Middle West for the past three years, it is necessary to use an unusually heavy spray schedule in order to obtain satisfactory control.

The above schedule should be applied only to fall and winter varieties and is not applicable to the early summer varieties, such as Transparent, Duchess and Benoni. Consult your local experiment station in regard to special sprays for these summer varieties which may be put on in such a way to, if possible, avoid washing.

The first second brood spray should be applied according to the warning sent out through the experiment stations. This spray should consist of four pounds lead arsenate, four pounds hydrated lime and two quarts of actual summer oil.

The second brood spray, consisting of the same materials, should be applied nine to 12 days after the first.

In heavily infested orchards where codling moth has been a very serious problem and where the owner of the

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orchard is equipped to do thorough washing, a third second brood spray of the same materials but cutting the lead arsenate to three pounds may be applied nine to 12 days after the second.

For additional late sprays consult your local experiment station as to the seasonal development of the codling moth. Also consult your station for information concerning combinations that can be used and removed satisfactorily by washing.

It is felt that the above schedule or modifications of it to fit local conditions will give satisfactory control even in the most heavily infested orchards. As stated at the beginning of the article, *this schedule will require thorough washing with the most up-to-date methods*; also, as previously stated herein, this schedule or any other schedule will not give satisfactory control unless the sprays are thoroughly applied. Spraying from the inside of the tree out is just as important as spraying from the outside in, and is necessary to secure thorough coverage. If the top is left unsprayed, it is a constant source of infestation for the remainder of the tree. It should also be kept in mind that the supplementary sanitary measures are necessary for a thorough clean-up, as no spray schedule has been worked out which will give control in a mature orchard which has not been thoroughly cleaned up.

Among the red grapes grown in Missouri, Catawba found most favor as a wine grape. Brighton was liked better than Delaware, the contention being that Delaware was not at its best under Missouri conditions.

A number of the Munson varieties, created by T. V. Munson, of Dennison, Texas, have high promise as wine grapes. Several were tried in a limited way around Hermann and were liked. Wine grape growers in Missouri like Munson's Muench, Wine King and Ellen Scott.

A Virginia apple grower, A. L. Ewers of Jersey Mountain, recently received the highest price paid that day for Delicious apples on the New York market. A carload of this variety sold at \$1.85 per bushel basket.

What is reported as one of the largest yields of apples for the 1934 season was made by A. W. Peters, Hood River, Ore., who picked 43,000 loose boxes of apples from a 20-acre orchard of Newtowns, Spitzenbergs and Ortleys.



You can depend upon "Magnetic Spray" Wettable Sulphur to give you a premium crop. Your fruit will be extra fancy, with a smooth velvety finish that will demand top prices. The best investment you can make this spring, is to buy "Magnetic Spray". Follow the example of thousands of successful growers who have used it with excellent results, season after season. When a whole year's crop is at stake, the best is none too good. Be sure—buy "Magnetic Spray"—it consists of 98.5% of the finest refined ventilated sulphur.



When you use a dusting sulphur, insist on "Magnetic" Super-Adhesive Dusting Sulphur, because it is 99.8% pure, excels in fineness, adhesiveness and gives continuous protection. It is economical to use and always the same high quality. Order "Magnetic" today, there's a dealer near you.

"Magnetic Spray" Wettable Sulphur • "Crown" Brand Wettable Sulphur • "Excelsior" Brand Sublimed Velvet Flowers of Sulphur • Commercial Flour Sulphur • Refined Roll (stick) Sulphur

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"Magnetic" Super-Adhesive Dusting Sulphur • "Crown" Brand Super-Adhesive Dusting Sulphur • Superfine Ventilated Dusting Sulphur • "Perfection" Brand Dusting Sulphur • "Toro" Brand Activated Soil Sulphur.

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HERE'S A SPRAYER CATALOG NEEDED BY EVERY ORCHARDIST

EVERY reader of American Fruit Grower, interested in spraying, should send at once for a copy of our new Catalog. This brand new edition shows the latest models of OSPRAYMO Orchard and Field Sprayers. The Sprayers range from the small but powerful Junior Outfit to the huge self-propelled sprayer with motor truck drive authorized by the U. S. Government for Gypsy Moth Control. Also a Trailer Combination Sprayer for use with tractor. Whatever your choice in sprayer styles, you will find it described in this new, profusely illustrated Catalog. Even if you are still getting good service from your old sprayer you want to get posted on recent improvements.

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OSPRAYMO SPRAYERS

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Equipped with powerful Duplex and Triplex Pumps, capable of maintaining ample pressure—100 lbs. or more if desired.

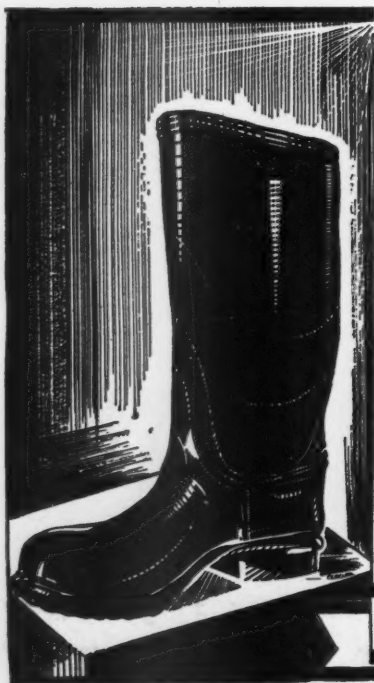
Absolute automatic control by means of Improved Pressure Regulator and Throttle Valve. Patent Agitator and Cleaner prevents clogging and assures even distribution of spray chemicals. Interchangeable Parts obtainable on short notice.

We are specialists in the manufacture of spraying equipment, that can be guaranteed to maintain uniform high pressure.

FIELD FORCE PUMP CO.
Dept. A, Elmira, New York
Makers of Sprayers for More
Than 65 Years



Uniform High Pressure Guaranteed



The "U S" boot
this year is as good as
we can make it
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since 1843



United States Rubber Company

Government Buys Famous Col- lection of Nut Trees

THE culture of hardy nut trees in the north will eventually benefit greatly by the acquisition by the U.S.D.A. of the famous Bixby collection on Long Island. This collection, its acquisition, and disposition are described in the following recent press release of the Department:

"Efforts of the United States Department of Agriculture to improve the quality of nuts in this country has received new impetus with the recent removal of approximately 10,000 nut trees from the nationally famous Bixby collection on Long Island to land under Federal supervision. This is believed to be the largest single transplanting of nut trees ever made, according to C. A. Reed of the Bureau of Plant Industry who supervised the work for the Department. Most of the trees were of nursery size, 1 to 3 feet in height. The largest trees moved were about 18 feet high and 3 inches in diameter at the base."

Approximately one-fourth of the trees eventually will go into the Shenandoah National Park. The rest were allotted to various divisions of the Department of Agriculture for experimental work. More than one-third of these were added to the nut plantings on the Department farm at Beltsville, Md. Approximately 700 trees were allotted to the recently acquired National Arboretum in Washington, D.C., about 500 went to the Forest Service to be planted at Troy, N.C., and more than 1,000 disease-resistant chestnuts were allotted to the Division of Forest Pathology. Funds for acquiring the trees were provided by the Director of Emergency Conservation Work.

The Bixby collection of nut trees, which was started by the late Willard G. Bixby as a hobby in 1916 and continued until his death recently, was the largest and finest in existence. The trees acquired by the Government consist of black and Japanese walnuts, butternuts, sweet hickory, shagbark, shellbark, bitternut, and pignut hickory; Chinese, Korean, Japanese, and European chestnut; American, European, and Turkish filberts, and hybrids of many varieties and species.

G. L. SLATE, Sec'y
Northern Nut Growers, Geneva, N. Y.

The 1934 claimant of the mythical title "world's champion apple packer" is Ralph Weisenstein, Wenatchee, Wash., who won a recent packing contest in Wenatchee by wrapping and packing three boxes of 150 apples each in 5 minutes and 42 seconds.

E. D. Norcross of Beaumont, Calif., picked a late Elberta peach in his orchard weighing a pound and a quarter. Peaches weighing a pound each are not uncommon in Hale and other varieties in the same district.

"Small wood pruning," a term originated by G. L. Ricks of Michigan, shows advantages in favor of larger and better colored fruit, without perceptibly reducing the yield. It also makes spraying more effective and thinning more economical.

Martin Anderson at Scotia, Calif., has a Satsuma plum tree which bore 350 pounds of fruit last summer.

**IT
WILL NOT
CLOG SCREENS
OR
NOZZLES**

**is the
IMPROVED
LEAD ARSENATE**

NuREXFORM is unusually effective in controlling codling moth and many other chewing insects—because of its several unique features.

NuREXFORM'S perfect suspension quality and the fineness of the particles eliminate clogging of screens and nozzles. Think of the annoyance, time and trouble that saves you.

IT SPREADS EVENLY

A **NuREXFORM** mixture in the tank is of uniform strength *always*. The coverage is not too thin and watery on the first trees sprayed—nor too heavy on the last trees. **NuREXFORM** thus assures uniform protection for the entire orchard. Every ounce put into the sprayer reaches your trees—no waste.

THE GRASSELLI CHEMICAL CO.
INCORPORATED
CLEVELAND OHIO



FREE

A valuable spraying and dusting schedule "How and When to Spray" will be sent to you upon request.

NuREXFORM
The Improved Arsenate of Lead

TAR OIL DISTILLATES

(Continued from page 11)

very much more expensive to separate this high boiling neutral fraction from the other portions of the distillate, investigators have decided that the difference in results does not warrant the separation of the basic and neutral fractions of tar oil distillates intended for fruit tree spray oils. Therefore, the creosote and anthracene oil fractions boiling off between 225° C. and 400° C. are the best all around fractions of tar oil for spraying work when handling, cost of materials, and results produced are taken into consideration.

Tar oil distillates which are used as ovicides in the control of aphids are not as effective against San Jose scale as the petroleum oils which are now in common use for the control of this insect. These tar oil distillates are not intended as a control measure of San Jose scale and where this pest is to be controlled the tar oil distillate must be applied with the petroleum oil or else the two oils should be applied separately for the control of aphids and San Jose scale.

The emulsification of tar oil distillates which are suitable for spraying purposes is not accomplished as easily as the emulsification of petroleum oils. Therefore, the practice of making the home-made tar oil emulsions has not come into general use. It is not impossible, however, to prepare tar oil emulsions in the spray tank and sooner or later this will become a general practice just as is the case with the petroleum oil emulsions. It would seem wise, however, in view of the fact that tar oils are harder to emulsify and are not thoroughly standardized, to let the manufacture of these oil sprays remain in the hands of the spray material manufacturers as long as they will make a good product and sell it at a fair price.

It was pointed out that tar oil distillates were intended mainly for the control of aphids in the dormant stage when applied to fruit trees. It has been found, however, that from two and one-half to three percent tar oil of the grade used for aphid control will give very good control of peach leaf curl and could be used for this purpose if it were necessary. Since we have two very efficient fungicides for the control of peach leaf curl, it seems that the use of a tar oil spray would not be warranted as a dormant spray for peach trees. Tar oil sprays, however, may be ap-

(Continued on page 24)



NuREXFORM Remains in Suspension

NuREXFORM has no settlings in the tank of your sprayer—no sediment to be scraped off the bottom and thrown away as waste.

Mixes readily with Lime Sulphur—This is but one of the many distinctive features of **NuREXFORM**.

For a larger pack of premium fruit next fall, be sure to specify **NuREXFORM** when you purchase Arsenate of Lead.

THE GRASSELLI CHEMICAL CO.
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NuREXFORM
The Improved Arsenate of Lead

Here's the sure way to KILL SCALE and other orchard pests

● What has been true for thirty years is true today—Scalecide kills every San Jose Scale it hits. A recent report states that in Illinois the scale has doubled since 1933 and increased nine times since 1932. A grower in sending the report writes, "I use Scalecide every year and there is not a scale in my orchard."

If in the mad rush for low prices quality has been forgotten, your orchard suffers. Remember, Scalecide costs but little more, yet is guaranteed to make a better orchard than lime sulfur or your money back, you and your neighbors to be the judges.

Scalecide not only kills scale, aphids, red mite and kindred insects, but reduces the codling moth population. No orchard using Scalecide regularly has a serious codling moth problem.

Scalecide is the only oil spray that has distinct fungicidal properties preventing the entrance of wood rotting fungi in pruning wounds and winter injury cracks, and helps to heal cankers on both peach and apple trees. Write today for prices. B. G. Pratt Company, Dept. 11, 50 Church Street, New York, N. Y.

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"Makes a Tree Outgrow Its Troubles"



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SULPHATE 40%
NICOTINE PRODUCTION CORPORATION
CLARKSVILLE, TENNESSEE

PENETROL
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KINKADE GARDEN TRACTOR
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A Practical, Proven Power Cultivator & Plow
for Gardeners, Suburbanites, Florists,
Truckers, Nurserymen, Fruit Growers
Low Prices - Easy Terms
American Farm Machine Co.
1105 33rd Av. SE, Minneapolis, Minn.

kerosene emulsion as recommended by A. J. Cook in 1878, followed by H. G. Hubbard's improved formula in 1882.

Kerosene emulsions were first used in California about a half century ago. This was followed in the nineties by crude oil emulsions. The pioneers in this field were the Block Fruit Co. and the John Bean Mfg. Co., who put out a famous product called "Buggo." In spite of later developments, some of these crude oil emulsions were more or less in vogue until about 1920, when they were superceded by the lubricating type of emulsions. Distillate oil emulsions have also been used for many years, appearing about 1900.

Oil First Used Without Water

Oil sprays were used without water in New Jersey as early as 1900. These sprays were soon abandoned, however, because of the damage resulting from the low grade of kerosene then available. About this time an apparatus known as "Kero-water sprayer" was put on the market that delivered water and oil through different tubes, supposedly to mix them at the nozzle. But when the sprayer did not work properly, as often happened, one might be spraying with pure water or pure oil. Some growers actually used crude oil heated in the spray tank and applied in as nearly a mist as was possible in the days of low pressures. The saving of water haul may have been a great economy but it was not long until they had no live orchards to spray.

About 1901, numerous attempts were made in southern California to use oil sprays to control scale insects on citrus fruits. These results, too, were largely disastrous because of damage to the trees. It was during this period W. H. Volck, later well known for his "Volck" oils, worked on the problem and developed the phytonomic oils that are now used in summer sprays for apples and citrus fruits all over the world.

Some of the early oil sprays were soap and oil emulsions. Very similar to the government formulas of today, they were made from lighter or even unrefined petroleum oils. But without the colloid mills and high pressure sprayers with violent agitators now in use, a stabilized emulsion could not be made or maintained, with the result that there was

often a partial or total separation of the oil and water.

Miscible Oils Have Long Usage

After the first emulsions, came the miscible oils. These had the appearance of a heavy oil, but they easily emulsified or "dissolved" in water, and when once properly mixed did not separate out. The oldest of these commercial brands, appearing in 1904 and still in use today, is Scalecide, developed by the well-known B. G. Pratt.

The success of these first miscible oils was such that during 1907 or 1908 the Connecticut and Delaware experiment stations issued bulletins telling the fruit grower how to make them at home from fish oil soap, crude carbolic or cresylic acid, and petroleum oil. But the task was too complicated for most growers and many mistakes were made, all too often visible in the ill effects on the trees. The formulas, however, are still used in commercial brands, showing that they were basically correct.

About 1905, Balfour, Guthrie & Co. introduced miscible oils into California. They have been used there to a limited extent ever since, although in most parts of the West, where transportation is a larger factor, they were practically eliminated by the lubrication type emulsions which cost less. In the Northwest, however, commercial miscible oils were used almost entirely in 1918, in dormant spraying for control of leaf roller and San Jose scale.

Lubricating Oils and Citrus

The first use of lubricating oils as insecticides seems to have been

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Cypress Wool Insulation

New and correct Insulation for fruit houses or ice boxes. Inexpensive but serviceable.

Write for prices and samples.

EXCELSIOR MILLS CORPORATION
P. O. Box 3236 Jacksonville, Fla.

made by W. W. Yothers in 1911. He had been stationed at Orlando, Fla., for many years working with citrus insects. Yothers combined dilute paraffin oil and red engine oil with caustic potash, using whale oil soap as an emulsifier. The spray solutions as used for citrus white fly contained one and one-half per cent actual oil.

Oils for general dormant use in reality go back to this time when lubrication oils such as red engine oil, Diamond paraffin oil, brown neutral and others were first utilized. In a real descriptive sense, these trade names mean very little. In general, these lubricating oils were high in viscosity, often running up to 220 Saybolt.

But a brief word must be injected here concerning lime-sulphur. In the decade between 1908 and 1918, lime-sulphur became the leading scale spray. In many sections, however, San Jose scale continued to increase, with the result that just after the World War, about 1918 or 1919, it had again become a serious problem in many districts. Many growers then began to switch back to using oil sprays. About this time the lubricating oil emulsion (government formula) was evolved using oil from 150 to 250 viscosity but which could not be applied with safety unless diluted to a strength of three per cent or even two per cent of actual oil.

Scale Control Early Problem

In the fall of 1921, A. J. Ackerman of the Federal Bureau of Entomology, began experimenting with lubricating oils for the control of the San Jose scale in Arkansas. A few preliminary tests of these oils were made the following year in the Pacific Northwest on the European red mite, followed by a more serious investigation in controlling red spider and San Jose scale in 1923.

During the early twenties, manufacturers had greatly improved their products. Oils were used which were similar in viscosity to red engine or brown neutral types, but more highly refined.

Following the use of the home-made soap emulsions in the Middle West, these were tried in the Pacific Northwest, but did not prove satisfactory, chiefly because the hard water broke down these emulsions. The home-made casein spreader formula, which originated in Missouri about 1922, was also unsatisfactory there.

The following figures, obtained from the Washington State Department of Agriculture, vividly portray the decided increase in use of

(Continued on page 28)

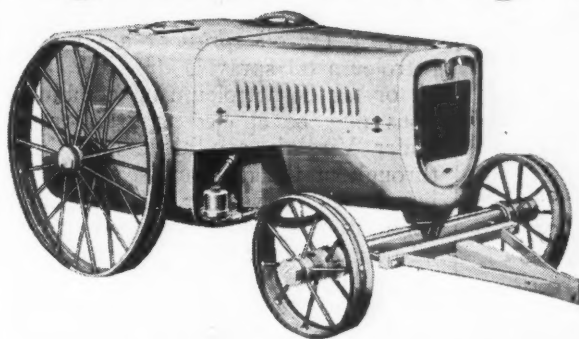
BAND FRUIT TREES—GRAPE VINES with **TREE TANGLEFOOT**



Apple, citrus, and other fruit trees, as well as grape vines, need the positive protection against creeping or climbing insects, that only **TREE TANGLEFOOT** can give. **TREE TANGLEFOOT** is a specially prepared, extra sticky compound to be used in banding trees and vines against the ravages of insects that creep or climb from the soil. A single application lasts nearly 3 months regardless of weather conditions. Absolutely non-injurious. Positively effective. Easy to apply. Economical. Obtainable from dealers. For better and more fruit, band with **TREE TANGLEFOOT** this year.

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Address _____
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ROLLIN H. TABOR, Mt. Vernon, Ohio

TAR OIL DISTILLATES

(Continued from page 21)

plied safely to peach trees in the dormant stage if such a practice were desired.

The percentage of tar oil distillate recommended in the United States for the control of aphids varies somewhat from the English recommendations. Under Virginia conditions, it has been found that as little as two percent of the proper grade of tar oil distillate will give very good control of aphids in the dormant stage. In England, however, they have used as high as seven and eight gallons of actual tar oil for each 100 gallons of spray solution. This high percentage is not necessary under our conditions. After taking all of the factors into consideration which are involved in the application of a spray material, it seems that the most effective amount of the proper grade of tar oil distillate to use for the control of aphids in the egg stage is two and one-half gallons for each 100 gallons of spray solution. This is true whether the tar oil distillate is used alone or in combination with a petroleum oil.

Tar oil distillate emulsions, or tar oil-petroleum oil emulsions should be applied to fruit trees only when the buds are thoroughly dormant. This applies to all forms of plants or trees where a tar oil spray or a tar oil-petroleum oil spray is desired. Tar oil or tar oil-petroleum oil combinations may be applied to fruit trees under Virginia conditions any time throughout the dormant season during favorable weather. It has been found in Virginia that tar oils or tar oil-petroleum oil combinations may be applied with very good results in late fall and early winter or as soon as the tree becomes thoroughly dormant. If possible, quiet warm days should be selected for the application of tar oil distillate sprays. Fruit growers should remember that in order to destroy aphid eggs it is necessary that they be thoroughly covered with tar oil, and to do this the tree must be thoroughly sprayed from bottom to top.

The injury commonly caused by tar oils to the skin is not dangerous but is very uncomfortable for a few days after the skin is burned. A piece of good oil cloth large enough to cover the face and cut somewhat in the shape of an apron with two holes for the eyes affords very good protection to the operator. After spraying with tar oils the operator should wash his face and hands thoroughly with soap and warm water. The face should then be rubbed thoroughly with rubbing alcohol to remove any tar oil which may be left after washing.

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● The range of outdoor sports is unlimited. Here you may enjoy horseback riding, sailing, canoeing and the finest deep sea fishing to be found on the Florida coast. For the exclusive use of our guests we have two private beaches. The one for sun bathing is located on Lake Worth. On the ocean side is the beach for surf bathing.

● MIRAMAR INN is comfortably and attractively furnished, providing rooms single or en suite, with private or connecting baths. Connecting rooms are obtainable for families. Rates for either American or European plan gladly furnished upon application.

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● MIRAMAR INN thus bids you welcome, to enjoy the cozy warmth of Florida sunshine, the surf and sand of the ocean, the gentle breezes of the Gulf Stream, the thrill of sports and games, the enjoyment of care-free hours. There is personalized attention to every guest's welfare and happiness at MIRAMAR INN.

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J. STANLEY SMITH, Managing Director

SOME TRENDS IN ORCHARDING

(Continued from page 7)

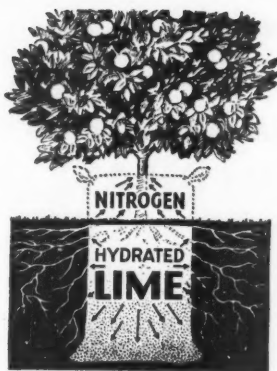
in sod orchards, grass is a very serious competitor with the tree for any applied nitrogen. The grass is better prepared to compete with the tree if the nitrogen is applied late in the season.

For these and other reasons of convenience and apparently superior results, many growers are applying at least part of their fertilizers in the fall. This is particularly true if cyanamide is used. Failing this, it is to be recommended that cyanamide be applied the latter part of February or early March. Later applications do not seem to be so effective and on very light soils are likely to cause injury if applied as late as May. The results in Ohio to date show cyanamide to be an excellent orchard fertilizer, equaling sulphate of ammonia for that purpose.

Nitrate of potash is receiving some attention in several sections but its use can hardly represent a trend, as yet. That there is a renewed interest in potash as a fertilizer for fruit trees seems clear. To what extent it will come into general use cannot be stated. The older experiments showed little benefit when it was applied in the usual way to apples and peaches. There is reason to believe, however, that there are special locations where its use will become general.

Much is said and written regarding the merits of organic matter, and a certain mysticism has often been associated with it. Yet it is true that at Rothamsted, England, chemical fertilizers have produced as great an increase in yield of farm crops over a long period of years as has barnyard manure which carried the same amount of nitrogen, phosphoric acid, and potash as that supplied in the fertilizer mixture. The same has been true at the Ohio Experiment Station. Along with these facts should be considered the rather surprising one that annual plants can be grown to full maturity in pure sand cultures if suitable nutrients and water are provided.

These situations would not seem to argue very strongly for organic matter in the orchard, and yet it is known that under some conditions at least, the full effect of fertilizers is not realized unless ample organic matter has been incorporated with the soil. Furthermore, it has become increasingly evident during the dry years



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It FEEDS the TREE and LIMES the Soil

'AERO' CYANAMID

A non-leaching form of nitrogen

May be applied in fall, winter (in Southern States), or early spring, as one prefers

Feeds the tree throughout growing season

Produces dark green leaves and holds them on until fall (On sandy and shaly soils the supplemental use of potash is recommended)

Keeps the soil sweet and healthy

Destroys acids resulting from use of sprays and cover crops

Produces good terminal growth and fruit buds

Gives bigger yields of better-quality fruit

Write for Leaflet X-307, "Fertilizing Fruit with 'Aero' Cyanamid"

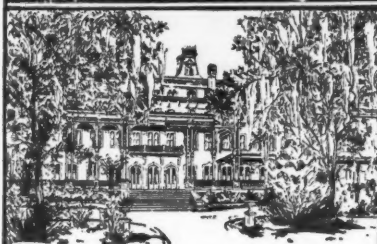
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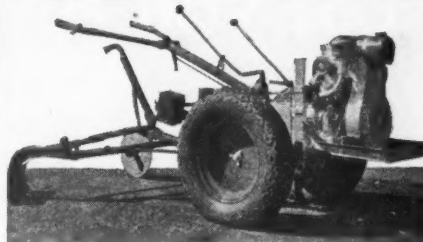
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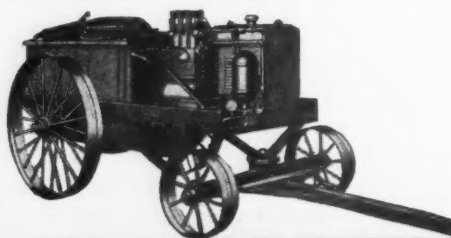
Mount Gilead HIGH PRESSURE POWER SPRAYER

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crop protection insurance money will buy. Decide
now to have a Mount Gilead working for you this
spring. Write for information.

The Hydraulic Press Mfg. Co.

385 Lincoln Avenue,

Mount Gilead, Ohio



PIONEER BUILDERS-HYDRAULIC FRUIT JUICE PRESSES

that a heavy mulch is one of the best treatments for orchards. In both cases it must be borne in mind that the moisture factor is of great importance. Recent results at the Federal Soil Erosion Experiment Station at Zanesville, Ohio, show the value of a ground cover in aiding the water penetration after a heavy rainfall.

Such cover crops or organic matter in or on the soil are potent factors in preventing run-off and this is one of the greatest necessities in an orchard. It is not the actual plant nutrients supplied nor the water-holding capacity of the soil that is affected so much as the mechanical improvement which permits water to penetrate and be held in the soil. Fertilizer materials can be readily supplied. Few American orchardists have soils which they can afford to neglect from the standpoint of the improved water relations where organic matter is provided in one form or another; and where this is taken care of the need for irrigation is less challenging.

For a number of years a few of the state experiment stations and the U. S. D. A. have been carrying on pioneer work with fruit stocks, that is, the best understocks on which to bud or graft the various fruits. This has not been given much attention because of the slow progress that is encountered in such an undertaking. Nevertheless, horticulturists are interested in the experiences of these workers and some would lay down a formula to the effect that we need a particular stock for a particular variety for a particular soil. This program is a long one and not likely to be realized in the near future.

There is a rather general feeling in this country, but it is by no means universal, that careful selection of seedlings and selection of the grafted or budded trees will give as uniform an orchard of trees as is secured from vegetatively propagated stocks. But the advantage of trees that are perhaps three-fourths the size of our present standard ones would be desirable. This means a continuation of the trials and experiments which are now under way to determine on which clonal stocks the standard varieties should be worked to secure semi-standard trees.

There is the further interest in stocks for sour and sweet cherry varieties. Mazzard stocks are inferior to Mahaleb for sour cherries, including Morellos, in most sections, although to the northern range of the country the latter still appear better. There is difficulty in securing a good stand of sour cherry trees on Mazzard stocks which is a very practical handicap in getting trees of this kind.

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ROTATION CROPS FOR STRAWBERRIES

(Continued from page 10)

use of sulphate of ammonia as a source of nitrogen, on acid soils may result in making the soil still more acid with serious injury to the strawberry plants, while no injury resulted from the use of nitrate of soda on such soils. Clark in New Jersey has found that the response of strawberries to sulphate of ammonia as a source of nitrogen was better when the soil solution was nearly neutral, and to nitrate of soda when the soil solution was quite acid.

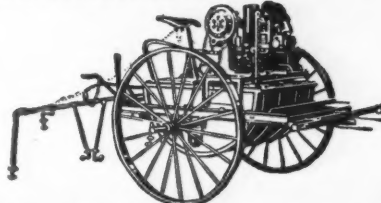
The results of these investigations indicate that, in general, nitrate of soda may be the better source of nitrogen along the Atlantic Seaboard and in western Washington and Oregon, while sulphate of ammonia may be the better source for most of California, for parts of eastern Oregon, and Washington, and for a large part of the Mississippi Valley region. Though generally correct, exceptions to this rule must be made. Many soils near the Atlantic are naturally nearly neutral or have been made so by liming. On these, of course, sulphate of ammonia may be a better source of nitrogen than nitrate of soda, while in the Mississippi Valley region there are many soils to which nitrate of soda may be applied.

Vegetable crops such as beets, onion, spinach, cucumber, eggplant, pepper, lettuce, and celery do not grow as well on somewhat acid soils as watermelon, beans, tomato, carrot, cabbage, and cauliflower, nor as well as such field crops as sweet potato, potato, rye, oats, wheat, buckwheat, millet, peanut, cowpea, hairy vetch, crimson clover, corn, cotton, and soybeans. Crops for the rotation on acid soils should be selected from the latter lists. If the soil is very acid, lime may be applied preferably before one of the rotation crops such as soy beans, cowpeas, or vetch. Liming just before strawberries has resulted in injury so often that liming two years before is to be preferred.

Another scheme to promote the national advertising of apples, the "King of Fruits," has been originated by Perry Buckley in California. The National Apple Promotion Bureau has been formed with headquarters in Watsonville. It is proposed that a charge of 50 cents per ton be levied against all apples marketed and shipped in all parts of the United States, supplemented by donations from others who reap a benefit from the apple industry.

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THE RISE OF OIL SPRAYS

(Continued from page 23)

oil sprays in the Northwest during the post war period. While Yakima county in 1918 used less than 12,000 gallons of oil for spraying purposes, 10 years later (1928) it used 687,900 gallons.

Ovicidal Value of Oil Discovered

Webster of Washington State College reported in 1924 that not only did these oil sprays appear to be very useful for controlling red spiders and other sucking insects, but that they killed the eggs of the codling moth very effectively. The use of the oil-lead arsenate combination in the early cover sprays is now considered of utmost value because of this ovicidal property of mineral oil. Late applications of this combination are not usually recommended, however, because of difficulties in residue removal.

Much credit for the development of oil sprays in the Northwest belongs to the "Western Co-operative Spray Project Conference." This group of Pacific Coast investigators, meeting first in 1926 at the suggestion of J. R. Parker, then associate entomologist at the Montana station, in a serious attempt to iron out such differences as then existed, all have been working on the perfection of methods in using oil sprays. This project has been maintained ever since and along with the investigations of others, such as de Ong and Smith, of California, and Kelley, of Illinois, definite specifications for oils and recommendations for their use have been worked out.

The experiment stations on the Pacific Coast were the first to take kindly to oil sprays and join hands with the manufacturers in an endeavor to ascertain toxicity values and safety factors. The paraffins and asphaltum base oils were compared; also the effect of viscosity and specific gravity on toxicity and safety.

The Northwest Conference decided in 1927 that the use of dormant oils was fairly well standardized, and that recommendations could be made regarding their use for the control of the fruit-tree leaf roller, scale insects, aphids, and red spider eggs. However, there was still much to be learned as to the best time for application, the effect of low temperatures following application, and other problems of a similar nature.

Oil Sprays Have Wide Application

Oil sprays have a wide application in their use. They have so far been found to be effective in the control

of such insects as San Jose scale, European red mite, brown mite, aphids, tree hoppers, leaf rollers, red spiders, red bug, pear psylla, case-bearers, etc. Some of these pests can be controlled effectively *only* by the use of oil sprays.

The use of oil for summer spraying was not very well standardized until recently. On account of this, manufacturers were continually changing their products. Good results had been obtained in the control of red spiders and codling moth, but several applications of oil often resulted in injury in one form or another to the trees. The fruit of yellow apples was particularly susceptible to oil injury; and trees in poor condition were invariably injured more than those in good vigorous condition.

For summer use, a rather heavy, highly refined oil was employed at first. Occasionally such summer applications caused considerable foliage injury, but the cause was soon attributed to high viscosity of the oils employed. Later, oils much lighter and slightly less highly refined were used with much less injury.

The oil spray problem was not merely entomological in its application. The physiological effects of oils on plants had to be considered, as well as the chemical aspects of oil combination sprays. The best methods of emulsifying the oils also needed to be ascertained.

Outside of the fact that oils containing the highest percentage of unsulphonatable residues are the safest on foliage, little more is apparently known concerning what factors affect toxicity and safety than were generally known several years ago. Fortunately, most oil sprays have proven fairly effective, even though not equally safe.

Many commercial oils followed the early recommendations for high viscosity, but little by little the viscosity has been reduced. It was found, for instance, that an oil with 100 viscosity gave fully as good results in dormant applications for scale control as one with 220. Dormant oils in the Northwest in general have a viscosity of about 110 and may run up to 120, although elsewhere in the United States higher viscosity oils are still used.

Fish Oil Joins List

Fish oil has been very successful when used with lead arsenate in the control of codling moth. A good

fish oil should be perfectly clear and remain liquid at 65° F.; a slow-drying type with an iodine number between 120 and 145. Pacific Coast herring oil and dogfish oil meet these requirements. Fruit sprayed with fish oil can be cleaned more easily with alkaline than with acid washes.

While good results have been obtained with the cryolite-mineral oil combination, fish oil is generally recommended in place of mineral oil when cryolite is applied. When sodium silicate is utilized in the wash, materials containing fish oil have been generally removed with comparative ease.

Of late years, tank mix emulsions are being used more and more on the Pacific Coast for both winter spraying and summer citrus spraying. They have not as yet proved suitable for work on apples, however, where the emulsions must be mixed with arsenate of lead.

Tar Oils Kill Aphis Eggs

The latest development in dormant oil sprays is a coal tar creosote oil emulsion for the killing of aphid eggs and the egg-wintering varieties of scale. This material must be applied when the trees are in a strictly normal condition, otherwise the spray serves as a crop control measure in addition to an ovicidal treatment.

One of the most *unusual* uses of oil ever to be reported comes from South Africa. There an emulsion of raw linseed oil (or seal oil), usually diluted to a five per cent strength, is applied to deciduous fruit trees approximately four weeks ahead of blooming time, for the purpose of giving uniform development of flower and leaf buds. In addition to preventing irregular foliage and blossoming in pear, apple, prune, etc., this emulsion apparently prevents serious injury from several types of mites and helps to hold woolly aphid in check.

Of equal interest in this country is a new method of again applying oils to the tree without water, recently worked out by the California Spray-Chemical Corp. Special equipment is utilized, however, which breaks up the oil into fine particles and disperses it as an enveloping cloud around the plant. It almost amounts to an air-oil emulsion. From 40 to 60 acres of orchard may be covered in one day with a single machine. Over 100 such machines were operated last year in California vineyards.

Insecticidal Use of Oil Growing

The use of oil as an insecticide has increased rapidly during the last few years. Rather than summer oils being entirely substituted for arsenate

FIGHT PESTS AND SAVE YOUR FRUIT THIS PROVEN WAY!

Growers everywhere have found the ORTHO Program highly effective and economical in control of most all insect pests and diseases.

● The ORTHO Summer Spray Program provides for control of Codling Moth, Scab, Brooks' Fruit Spot, Scale, Red Mite and most all Insect Pests and Diseases that attack trees, fruit and profits.

ORTHOL-K and Lead Arsenate with ORTHO Spreader affords the most complete known control for Codling Moth. ORTHOL-K, the Ortho Oil Spray for summer use, kills the eggs, reduces "stings," and greatly increases the effectiveness of the Lead.

ORTHOL-K combined with Nicotine Sulphate has proved a highly effective, economical, and satisfactory substitute for Oil-Lead in control of Codling Moth. At the same time it is an excellent clean-up spray for Red Mite, Scale, Aphids, Leaf Hoppers, Case Bearers, etc., and ends the problem of residue removal.

IMPROVED COPOSIL, a colloidal copper fungicide, rated by well-

known authorities as safer than Bordeaux or other copper fungicides for control of Scab, Brooks' Fruit Spot, Blotch, and similar diseases. It mixes readily with the ORTHOL-K-Lead Arsenate or Nicotine Sulphate combination.

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[**DORMANT OIL SPRAYS**—For dormant spraying, we recommend: FLOWABLE KLEENUP, KLEENOCIL (mineral oil-cresylic acid), KLEENUP-TAR Oil Emulsion, ORTHO STRAIGHT TAR Oil Emulsion and ORTHO Miscible Oil.]

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TWO SMALL, ONE LARGE CAPACITY SPRAY pumps. **GEORGE FERGUSON**, 2138 Wooster Road, Rocky River, Ohio.

of lead sprays, as was originally suggested, the trend now is to combine oil with arsenate of lead (or other poison) at least in the most important first brood (codling moth) applications. Under the extreme heat conditions of 1930, it was found that a two per cent oil was not entirely safe.

Then followed the development and recommendation of the oil-nicotine combination for second brood application in place of lead arsenate, in which the oil concentration could be reduced, thereby obtaining a larger margin of safety and at the same time better control. Oil and nicotine, long used separately as plant sprays, came into specific use in combined form about 1928. As such, it not only has ovicidal power but becomes both a contact and stomach insecticide.

The common summer oils have been of the paste or "mayonnaise" type. Efforts are being made, however, to effect improvements in these oils in one or more directions. One new type of summer oil which is a departure from the creamy emulsion type has recently been developed by the Standard Oil Co. (Indiana), and tested under actual or hard use by their entomologist, Dr. C. R. Cleveland. This new oil is a clear, light-colored liquid, containing 95 per cent actual white oil and no water. Insecticidal chemical compounds make up the other five per cent. It is emulsified in water, not in the same way as a miscible oil, but by agitation and pumping under pressure. Combined with lead arsenate, this oil produces a coverage which is supposed to result in less color blotching or spotting than with the paste emulsions. It is also not subject to hard-water curdling.

Requirements of a Satisfactory Summer Oil

Modern summer oil emulsions, made from white oil stocks ranging from 90 to 95 per cent in refinement, have no ill effects upon foliage, fruit, and trees. Being of low viscosity or "body," they secure a good wet-tability without undue carrying over of oil film. A good summer oil must not only give good ovicidal action but must be instrumental in building up an even, heavy coating of the arsenical used with it as an insecticide. The emulsion resulting from a good summer oil must also be neutral, causing no liberation of free arsenic, copper, etc. When combined with nicotine, this neutral feature is of utmost importance.

Fortunately for the fruit grower, there are several brands of reliable summer oils, backed by adequate experimentation and reliable manufacturers.

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- Amazing new spray oil (with lead) saved 75.9% clean fruit under severe test while the best paste emulsion saved only 28.7% and lead alone only 1.4%—Boosted money return per tree \$7.15 over lead alone—Residue more easily removed.

Spreads farther—kills eggs, insects—Prevents stings

75.9% CLEAN FRUIT in Strongly Infested Orchard

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Treatment	% Clean	% Wormy	% Stung	Number of Stings Per 100 Apples
Lead only all season....	1.4	18.2	98.2	572.2
Superla Summer Spray				
Oil with lead all season	75.9	0.9	23.8	34.5
Paste with lead all season	28.7	6.0	69.8	161.3
Commercial Grade (Based on Codling Moth Injury)				

Winesaps

Treatment	U.S. No. 1 (Stings)	No. 2 or Poorer (Stings)	No. 2 or Poorer (Worms)	Total No. 2 or Poorer
Lead only all season....	41.0%	54.0%	5.0%	59.0%
Superla Summer Spray				
Oil with lead all season	89.27	10.27	0.46	10.73

335 STINGS PER 100 APPLES WITH LEAD ALONE—

Only 38.2 With Superla Summer Spray Oil and Lead

FIELD TEST No. 2

Winesaps

Treatment	% Clean	% Wormy	% Stung	Number of Stings Per 100 Apples
Lead only all season....	16.1	4.7	83.7	335.0
Superla Summer Spray				
Oil with lead all season	74.6	0.47	24.9	38.2
Paste with lead all season	49.4	1.3	50.0	100.2

LESS THAN 1% WORMY

With Superla Summer Spray Oil and Lead
FIELD TEST No. 3

Jonathans

Treatment	% Clean	% Wormy	% Stung	Number of Stings Per 100 Apples
Lead only all season....	53.0	12.1	42.8	69.9
Superla Summer Spray				
Oil with lead all season	89.5	0.7	9.8	11.4
Paste with lead all season	71.9	4.7	25.9	35.5

● Eight years of experiment and test have now borne fruit—in both senses of the term! The Standard Oil Company is now ready to announce a new summer spray oil that makes possible, for the first time, *practically complete control of the codling moth!* Glance at the figures at the

left. They give the important facts demonstrated by tests in infested orchards in 1934.

In every case, Standard's new Superla Summer Spray Oil with lead gave far more clean fruit than other sprays. Think of it: less than 1% of the crop wormy, every time!

\$7.15 More Return Per Tree!

But the figures don't tell the half of it. How about residue? More easily removed than paste. How about burned foliage? None. How about color? Hardly affected at all. How about profit? *The new Superla Summer Spray Oil with lead paid a net return of between \$4.09 and \$7.15 more*

per tree than lead treatment alone. The cheapest spray proved the most expensive in the end!

Write for details of the exhaustive field tests that prove this amazing new product the greatest threat to the Codling Moth ever developed.

Lasts Longer

Superla Summer Spray Oil is 95% oil. It pours freely and disperses readily in the tank, and the added agent, recently developed by the research staff of this Company, causes it to spread evenly over the fruit

and maintain a high killing power for a longer period.

Place your order now. Superla Summer Spray Oil will mean cleaner fruit and greater profit for you this season!

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Superla Summer Spray Oil



STANDARD OIL COMPANY

(INDIANA)

910 So. Michigan Ave.,

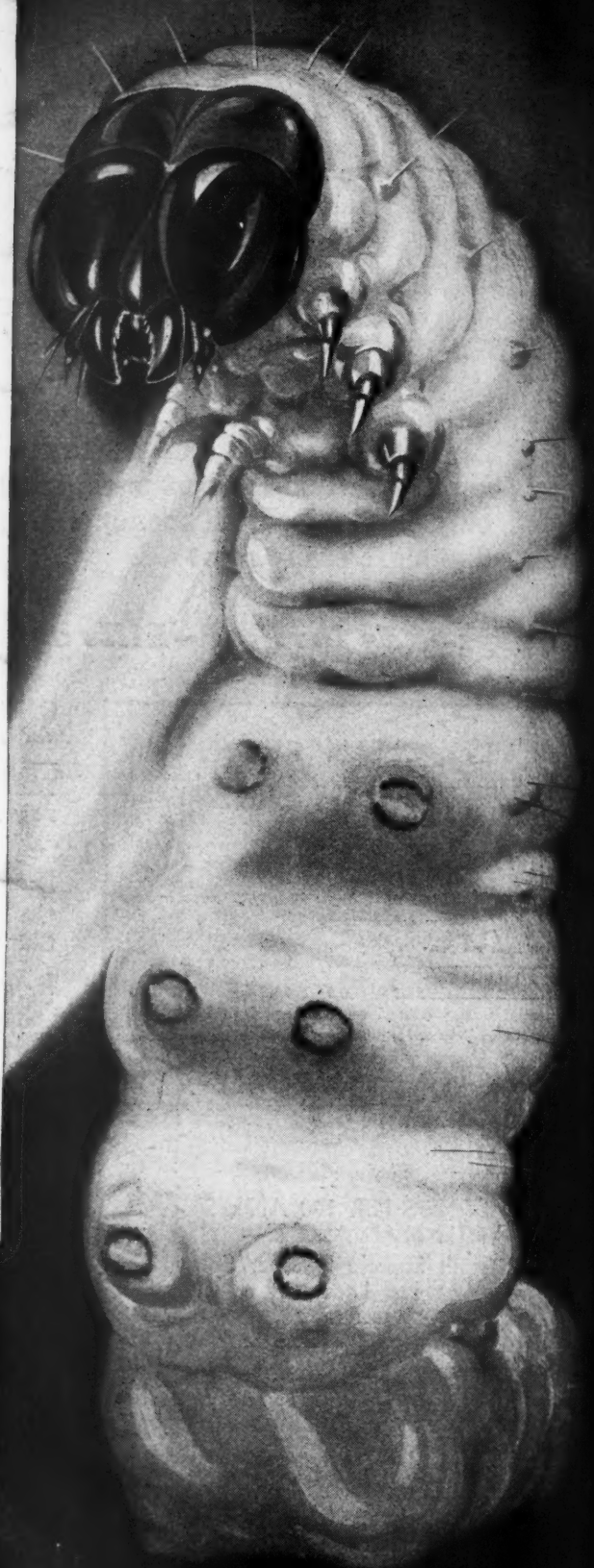
Chicago

GET *FRUIT ENEMY* *NO. 1.*

PICTURED at the right is the codling moth—Enemy No. 1 of the fruit grower. He really is as destructive as he looks. Unless aggressive control measures are employed, he will eat up all your profits. Your only protection is complete orchard sanitation and timely and thorough spraying with Dow Lead Arsenate. Don't use lead arsenate substitutes. One year of experiment proved how costly they are.

Another problem every fruit grower has to contend with is the control of scab. Dow Dry Lime Sulphur will do this effectively without russetting or foliage burn. It will also impart better color and superior finish to your fruit.

Use Dow Lead Arsenate, Dow Dry Lime Sulphur and other Dow Insecticides for real crop protection.



TRADE

MARK

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN
A COMPLETE LINE OF INSECTICIDES